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| 10/817,552      | 04/02/2004  | Mirsaid Bolorforosh  | 2004P03346US        | 2523             |

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| EXAMINER |
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KITOV, ZEEV V

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| ART UNIT | PAPER NUMBER |
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2836

DATE MAILED: 11/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/817,552

Applicant(s)

BOLORFOROSH ET AL.

Examiner

Zeev Kitov

Art Unit

2836

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 06 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1 - 21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 - 21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 November 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

Examiner acknowledges a submission of the amendment and arguments filed on October 6, 2006. Amendment and arguments have overcome rejections under 103(a). A new Office Action follows.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 - 6, 12, 13, 15, 16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baumgartner et al. (US 2004/0113524) in view of Shen (US 5,536,958) and Amano (US 7,032,454). Regarding Claims 1, 12 and 20, Baumgartner et al. disclose the capacitive membrane ultrasound transducer (Fig. 1) including a flexible membrane (8 and 12 in Fig. 1) adjacent a void (20 in Fig. 1). It inherently includes a conductor connected with the flexible membrane, since otherwise the transducer cannot function.

However, it does not disclose a voltage limiting circuit. Amano teaches that the capacitive membrane is vulnerable to the high voltages (ESD prone, col. 1, lines 62 – 64). Therefore, one of ordinary skill in the art would realize necessity of protecting the capacitive membranes against over-voltages.

Shen discloses the circuit protecting of the capacitive gate to substrate structure of the transistor against over-voltages. The voltage limiting circuits (25 and 29 in Fig. 4) protect the capacitive gate to substrate structure of the transistor. The reference is pertinent to the problem soled by the inventor, i.e. protection of the capacitive structure vulnerable to ESD against over-voltages. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Baumgartner et al. solution by adding the voltage limiting circuit connected to the output transducer conductor, because according to Amano (ESD prone, col. 1, lines 62 – 64), the capacitive transducers are vulnerable to the ESD and therefore, need the over-voltage protection.

Regarding Claim 12, Baumgartner et al. disclose the membrane generating either acoustic or electric signal (paragraphs [0002] - [0007]).

Regarding Claim 2, Baumgartner et al. disclose the conductor including an electrode on the flexible membrane (12 in Fig. 1) and inherently a signal trace connected with the electrode, since otherwise the device is inoperative.

Regarding Claim 3, Shen et al. disclose at least one zener diode connected between the conductor and the ground. The couple of zeners (25 in Fig. 4) is connected between the input signal terminal potentially carrying the over-voltage and the ground. A motivation for modification of the primary reference is the same as above.

Regarding Claim 13, Shen et al. disclose the protection circuits (25 and 29 in Fig. 4) holding a voltage between electrodes constant when the voltage exceeds the preset breakdown voltage. In Baumgartner et al. system modified according to teachings of

Shen et al. the breakdown voltage of the zener couple is lower than the breakdown voltage of the membrane. A motivation for modification of the primary reference is the same as above.

Regarding Claim 4 and 15, Shen et al. disclose the protection circuits including two zener diodes in series with opposite polarities (25 and 29 in Fig. 4). A motivation for modification of the primary reference is the same as above.

Regarding Claim 5 and 6, Shen et al. disclose a first voltage source and a second voltage source (24 and 27 in Fig. 4). It further discloses a first couple of diodes (25 in Fig. 4) connected between the input terminal and the first voltage source (ground) and a second couple of diodes connected between the input terminal and the second voltage source. A motivation for modification of the primary reference is the same as above.

Regarding Claim 16, Shen et al. disclose limiting the voltage with a first voltage source (27 in Fig. 4) and a first diode (29 in Fig. 4) connected between the input terminal (26 in Fig. 4) and the first voltage source. In the Baumgartner et al. device protected according to teachings of Shen et al. the diode is connected between one of the electrodes and the first voltage source. A motivation for modification of the primary reference is the same as above.

Claims 7 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baumgartner et al. in view of Shen, Amano and Van Kraukauer et al. (US 5,617,283). Claims 7 and 14 differ from Claims 1 and 12 rejected above by their limitations of

shorting two electrodes, or drawing the current away from electrodes, thus reducing the voltage. Kraukauer et al. discloses the over-voltage protection circuit, which shortens two terminals (pad and ground, i.e. 12 and Vss in Fig. 1) in a case of the over-voltage by activation of the protecting element (18 in Fig. 1). The protecting element (18 in Fig. 1) is drawing the current away from the couple of terminals (12 and Vss in Fig. 1) thus reducing the over-voltage between them. The reference is pertinent to the problem the inventor was solving, i.e. providing over-voltage protection to the over-voltage sensitive equipment. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Baumgartner et al. solution by adding the protecting element shorting the two electrodes of the protected device according to teachings of Krakauer et al., because the shorting (clamping) is the most effective way of the over-voltage protection. As Krakauer et al. stated (col. 1, lines 26 – 39), the ESD clamp shunts the current associated with an ESD event away from the operating circuit (protected device) thus maintaining the voltage at the value known to be safe for the protected device. These features make the ESD clamp preferable over other solutions such as zener diodes.

Claims 9 – 11, 18, 19, 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baumgartner et al. in view of Shen, Amano and Wagner et al. (US 5,430,595). Baumgartner et al., Shen and Amano disclose all the elements of Claims 1 and 12. However, regarding Claims 9 - 11, 18, 19, they do not disclose the voltage limiting circuit being positioned at different locations such as within a transducer probe,

integrated with preamplifier, or within a transducer connector. Wagner et al. disclose the protecting diodes (elements 21, 22 in Fig. 2) being positioned adjacent to the protected elements (transistors 41, 42 in Fig. 2, col. 7, lines 3 – 19). Both references have the same problem solving area, namely protecting the electronic circuits against over-voltages. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Baumgartner et al. solution by placing the protecting diodes adjacent to the protected element, i.e. within a transducer probe, integrated with the preamplifier, or within a transducer connector of an imaging system (again to protect the preamplifier), because as Wagner et al. state (col. 7, lines 3 – 19), it is done to minimize the resistance between the anode of the diode and the protected element (transistor).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Baumgartner et al. in view of Shen, Amano, Van Kraukauer et al. and Robinson (US 5,940,259). Claim 8 differs from Claims 1 and 7 rejected above by its limitation of the protecting switch including a relay. Robinson discloses the over-voltage surge protection switch (116 in Fig. 4) including an AC relay (66 in Fig. 3, col. 6, lines 34 – 48, 114 in Fig. 4, col. 8, lines 12 – 19) and a DC relay (126 in Fig. 5, col. 8, lines 37 – 41). The reference is pertinent to the problem the inventor resolves, i.e. over-voltage surge protection. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Baumgartner et al. solution by adding the over-voltage protection switch circuit including the relay according to teachings of

Robinson, because as Robinson states (col. 3, lines 49 – 57), the inductive relay coil is used in series with the SCR to protect the SCR against excessive current, since at high frequencies typical for the over-voltage surge the inductive coil presents a high impedance.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Baumgartner et al. in view of Shen, Amano and Kwong (US 6,118,540). Claim 17 differs from Claim 12 rejected above by its limitation of shorting the first electrode to the second electrode at the time other than during performance. Kwong discloses the ESD protection circuit with the ESD switch (16 in Fig. 2) shorting two power supply terminals in order to protect them against ESD at the time other than during performance (col. 4, lines 10 – 15, 23 – 35). In the Baumgartner et al. system modified according to teachings of Kwong, the output terminals of the capacitive transducer are shorted by the switch similar to the switch of Kwong. The reference is pertinent to the problem, which inventor was resolving, i.e. protection against the over-voltage surge. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the Baumgartner et al. solution by providing the over-voltage surge protection switch according to teachings of Kwong, because as Kwong states (col.4, lines 29 – 35), ESD typically do not occur when the device is active and powered up. ESD events occur during specialized ESD testing and during handling (movement).




***Response to Arguments***

Applicant's Arguments have been given careful consideration but they are mostly moot in view of new grounds of rejection.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zeev Kitov whose current telephone number is (571) 272 - 2052. The examiner can normally be reached on 8:00 – 4:30. If attempts to reach examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571) 272 – 2800, Ext. 36. The fax phone number for organization where this application or proceedings is assigned is (571) 273-8300 for all communications.

Z.K.  
11/12/2006

  
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